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## Stochastic modeling of bacterial chromosome segregation

Eukaryotic cells use complex machineries during division in order to ensure the faithful segregation of their DNA to the daughter cells. In prokaryotic cells, similar active segregation mechanisms are beginning to emerge. Here we present stochastic mathematical models that describe the segregation machinery of *Caulobacter crescentus*. In this bacterium, depolymerizing filamentous proteins have been implicated in fueling and directing the movement of the replicated circular chromosome copies. We show that the spatial organization of the filaments and their dynamics can have unexpected effects on the chromosome movement mediated by processive binding of depolymerization-inducing proteins. Finally, we discuss a continuum PDE model that captures the movement of DNA as well as the cytoplasmic dynamics of regulatory proteins for this bacterium. We conclude by highlighting similarities in division mechanics between these bacterial cells and higher eukaryotic cells.